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EXAMINER	
TYNAN, MATTHEW	

ART UNIT	PAPER NUMBER
2871	

NOTIFICATION DATE	DELIVERY MODE
08/21/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/539,806	LEBRUN ET AL.	
	Examiner	Art Unit	
	Matthew Tynan	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 6/6/2007 have been fully considered but they are not persuasive.

2. Regarding the rejection of claims 11-13 and 15-17 under 35 U.S.C. 103(a) as being unpatentable over Walker (U.S. 2002/0024628) in view of Huang (U.S. 2002/0071085) and Ohno (U.S. 4,600,273), the applicant argues (pg. 9) that moving the land pads 405 of Walker from the semiconductor substrate to the transparent substrate would require "a complete redesign and change in operating principle." The examiner asserts that neither a complete redesign nor a change in operating principle would be required. Regarding redesign, the teachings of Huang suggest moving the electrodes for external connection from the silicon substrate to the transparent substrate in order to allow the use of UV-curable adhesives for attaching the external driving means. This is beneficial in that UV resins typically have shorter curing times than heat-cured resins, and additionally it allows simultaneous bonding of both display substrates and the printed circuit board (Huang, [0025]). Thus, Huang provides motivation for this limited redesign. Regarding the suggested change in operating principle, there appears to be no change in operating principle, as the device is still controlled by signals applied by external circuitry. The only change is a relocation of connecting electrodes.

3. The applicant admits that an "artisan would certainly understand that the use of UV adhesives... can only be effective if done [using] a transparent substrate." This agrees with the teachings of Huang, which require moving the external connecting means from the silicon

substrate to the transparent substrate in order to allow the use of UV-cured adhesives for attaching a printed circuit board.

4. The applicant also argues (pg. 11) that there is no teaching for cutting a display substrate along cutting lines closely adjacent to the sealing frame. However, there is a desire in the LCD field to decrease the size, weight, and cost of displays. This desire provides the motivation for cutting closely adjacent to the sealing frame (as shown, e.g., in Walker, Fig. 13), in order to avoid excess size and weight of the display substrates.

5. The applicant argues (pg. 11, last paragraph) that the advantages of Ohno are relative to the conventional panels of Figs. 1, 2, and 4 and are irrelevant to Walker and Huang. However, the teachings of Ohno are highly relevant to both Walker and Huang, which both require electrical connections between the two substrates. The electrical connecting means taught by Ohno provide effective, reliable electrical connections between the substrates, especially in comparison to conductive resinous pastes. Thus, the teachings of Ohno are a known means of improving the electrical connections between the substrates.

6. The applicant also argues (pg. 13) regarding claims 18 and 24 that Huang and Ohno do not teach silicon substrates including exterior sides that are closely adjacent to the corresponding exterior sides of the sealing frame. Again, there is a desire in the LCD field to decrease the size, weight, and cost of displays. This desire provides the motivation for cutting the substrates closely adjacent to the sealing frame in order to avoid excess size and weight of the display substrates.

7. Finally, the applicant argues (pg. 13) that Huang and Ohno do not disclose contact pads in close proximity to and connected with the active matrix circuit. However, the contact pads

providing electrical connections from the circuit drivers must inherently be connected to the active matrix circuit in order to apply the display signal. Because they are connected to the circuit, it is apparent that they must be in close proximity to the circuit as well.

8. The applicant's amendments have overcome the objection to claims 18 and 24, and this objection is therefore withdrawn.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 11-13 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walker et al. (U.S. Pub. No. 2002/0024628) in view of Huang et al. (U.S. Pub. No. 2002/0071085) and Ohno (U.S. Patent No. 4,600,273).

11. Regarding claim 11, Walker et al. discloses a method of fabricating a plurality of liquid crystal cells, each comprising a first substrate comprising a back electrode and a second active matrix substrate which are assembled with a sealing frame, the method comprising: collectively forming a plurality of the first substrates on a transparent support; collectively forming a plurality of second substrates on a silicon wafer, the second substrates having contact pads in close proximity to and providing connections to the active matrix circuit; cutting the second substrate from the silicon wafer along cutting lines closely adjacent to corresponding sides of the sealing frame (at least two sides are closely ; assembling each of the cut substrates together with a corresponding first substrate and the sealing frame, the sealing frame including an insulating

material; and separating each assembly into individual liquid crystal cells by cutting the transparent substrate.

12. Walker et al. does not disclose: forming means for external connection on each first substrate opposite the contact pads of the second substrate; overlapping of the contact pads by an opposite portion of the means for external connection; conducting elements disposed in the seal configured to provide electrical continuity between each overlapped contact pad and the corresponding means for external connection; or that a zone of each first substrate comprising means for external connection is overhanging with respect to the second substrate to which it is assembled.

13. However, Huang et al. teaches forming means of connection on each first substrate opposite the contact pads of the second substrate and a zone of each first substrate comprising means for external connection is overhanging with respect to the second substrate (see Fig. 8). This structure is beneficial for several reasons, including that it allows for UV-curing of the adhesive used to bond the liquid crystal panel and the printed circuit board. UV resins typically have shorter curing times than heat-cured resins, and additionally it allows simultaneous bonding of both display substrates and the printed circuit board (Huang, [0025]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device disclosed by Walker et al. by moving the external connections from the silicon substrate to the transparent substrate as taught by Huang et al. in order to allow the use of UV-cured adhesive in bonding the liquid crystal panel and the control circuitry.

14. Furthermore, Ohno teaches conducting elements disposed in the seal configured to provide electrical continuity between each overlapped contact pad and the corresponding means

for external connection (see Figs. 5-8). Ohno shows that disposing conducting elements in the sealing material to provide electrical connection to the opposite substrate is a known alternative to providing a separate conductive connection outside the sealing material (as in Fig. 2). Furthermore, the process provides a very reliable electrical connection between the two substrates. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device taught by Walker et al. and Huang et al. using the conductive material disposed in the seal as taught by Ohno in order to achieve a very reliable electrical connection between the two substrates.

15. Regarding the limitation of cutting the second substrate from the silicon wafer along cutting lines closely adjacent to corresponding sides of the sealing frame, one of ordinary skill in the art would be motivated to decrease the size of the display substrates in view of decreasing the size, weight, and cost of the display. Thus, the substrates would be cut in order to eliminate excess material. Because the means of electrically connecting the substrates is disposed in the seal, as taught by Ohno, the excess portion of the silicon substrate as shown in Fig. 36 in Walker et al. (including the contact pads 503 and the connecting material 170) would be unnecessary and therefore eliminated. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to cut the silicon wafer along lines closely adjacent to corresponding sides of the sealing frame.

16. Therefore, claim 11 is unpatentable.

17. Regarding claim 12, Walker et al. discloses filling the cavities with liquid crystal.

18. Therefore, claim 12 is unpatentable.

19. Regarding claim 13, Ohno teaches the conducting elements include conducting balls.

20. Therefore, claim 13 is unpatentable.

21. Regarding claim 15, Walker et al. teaches conducting elements including metal tags (405) produced on the silicon substrate. Therefore, claim 15 is unpatentable.

22. Regarding claim 16, Ohno teaches the conducting elements are include spacers (col. 3, lines 6-8). Therefore, claim 16 is unpatentable.

23. Regarding claim 17, Ohno teaches other spacer elements disposed in the seal, the other spacer elements being conducting or otherwise, and of a same nature as or of a different nature from the conducting elements. Therefore, claim 17 is unpatentable.

24. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Walker et al., Huang et al., and Ohno as applied to claim 11 above and further in view of Chang et al. (EP 827190 A2).

25. Regarding claim 14, the combination of Walker, Huang, and Ohno does not teach conducting elements including resin tags furnished with a conducting layer.

26. However, Chang et al. teaches conducting elements (Fig. 1A) including resin tags (32) and furnished with a conducting layer (36). This configuration allows a bond to be made with low bonding force, greatly reduces the force tending to separate the connections after bonding, and results in extremely reliable physical and electrical connections (col. 2, lines 29-34).

27. It would have been obvious to one of ordinary, skill in the art at the time the invention was made to modify the device taught by Walker et al., Huang et al., and Ohno using the conductive bump taught by Chang in order to create extremely reliable physical and electrical connections.

28. Claims 18-21, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang et al. (U.S. Pub. No. 2002/0071085) in view of Ohno (U.S. Patent No. 4,600,273).

29. Regarding claim 18, Huang et al. discloses a liquid crystal cell comprising: a transparent substrate comprising a back electrode, a silicon substrate comprising an active matrix circuit with contact pads in close proximity to and connected with the active matrix circuit, the substrates being assembled together with a sealing frame so as to provide a cavity between the substrates configured to contain liquid crystals; and the transparent substrate includes means (94) for providing external connections that are disposed overhanging with respect to the silicon substrate, with means for providing the external connections including a portion overlapping with the contact pads on the silicon substrate.

30. Huang et al. does not disclose the silicon substrate includes exterior sides that are all closely adjacent to corresponding sides of the sealing frame; the means for providing external connections includes a portion overlapping with the sealing frame; or at least a portion of the sealing frame includes sealing material containing conducting elements configured to provide electrical continuity between each overlapped contact pad and an opposite portion of the mans for providing external connections.

31. However, Ohno discloses at least a portion of the sealing frame includes sealing material containing conducting elements configured to provide electrical continuity between each overlapped contact pad and an opposite portion of the mans for providing external connections. Ohno shows that disposing conducting elements in the sealing material to provide electrical connection to the opposite substrate is a known alternative to providing a separate conductive connection outside the sealing material (as in Fig. 2). Furthermore, the process provides a very

reliable electrical connection between the two substrates. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device taught by Walker et al. and Huang et al. using the conductive material disposed in the seal as taught by Ohno in order to achieve a very reliable electrical connection between the two substrates.

32. Regarding the limitation of the silicon substrate including exterior sides that are all closely adjacent to corresponding sides of the sealing frame, one of ordinary skill in the art would be motivated to decrease the size of the display substrates in view of decreasing the size, weight, and cost of the display. Thus, the substrates would be cut in order to eliminate excess material, resulting in a exterior sides that are all closely adjacent to corresponding sides of the sealing frame.

33. Therefore, claim 18 is unpatentable.

34. Regarding claim 19, Ohno teaches the conducting elements are include spacers (col. 3, lines 6-8).

35. Therefore, claim 19 is unpatentable.

36. Regarding claim 20, Ohno teaches other spacer elements disposed in the seal, the other spacer elements being conducting or otherwise, and of a same nature as or of a different nature from the conducting elements of the seal.

37. Therefore, claim 20 is unpatentable.

38. Regarding claim 21, Ohno teaches the conducting elements include conducting balls (col. 2, lines 5-15).

39. Therefore, claim 21 is unpatentable.

40. Regarding claim 23, Huang et al. teaches the conducting elements include metal tags produced on the silicon substrate (Abstract, lines 5-6).

41. Therefore, claim 23 is unpatentable.

42. Regarding claim 24, the combination of Huang et al. and Ohno teaches a liquid crystal display comprising: a liquid crystal cell, wherein the liquid crystal cell comprises a transparent substrate comprising a back electrode; a silicon substrate comprising an active matrix circuit with contact pads in close proximity to and connected with the active matrix substrate; the substrates being assembled together with a sealing frame so as to provide a cavity between the substrates configured to contain liquid crystals; the silicon substrate includes exterior sides that are all closely adjacent to corresponding sides of the sealing frame; the transparent substrate includes means for providing external connections to the liquid crystal cell that are disposed overhanging with respect to the silicon substrate with the means for providing the external connections including a portion overlapping with a part of the sealing frame and the contact pads on the silicon substrate; at least the portion of the sealing frame between the means for providing external connections and the contact pads includes sealing material containing conducting elements configured to provide electrical continuity between each overlapped contact pad and an opposite portion of the means for providing external connection.

43. Therefore, claim 24 is unpatentable.

44. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huang et al. and Ohno as applied to claim 18 above and further in view of Chang et al. (EP 827190 A2).

45. Regarding claim 22, the combination of Huang and Ohno does not teach conducting elements including resin tags furnished with a conducting layer.

46. However, Chang et al. teaches conducting elements (Fig. 1A) including resin tags (32) and furnished with a conducting layer (36). This configuration allows a bond to be made with low bonding force, greatly reduces the force tending to separate the connections after bonding, and results in extremely reliable physical and electrical connections (col. 2, lines 29-34). It would have been obvious to one of ordinary, skill in the art at the time the invention was made to modify the device taught by Huang et al. and Ohno using the conductive bump taught by Chang in order to create extremely reliable physical and electrical connections.

47. Therefore, claim 22 is unpatentable.

Conclusion

48. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Tynan whose telephone number is 571-270-1433. The examiner can normally be reached on Mon-Fri. 7:30-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-4491. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MT

ANDREW O. ARENDT
PRIMARY EXAMINER